

REMARKS

This amendment is responsive to the Final Office Action mailed June 10, 2009, which action stated rejection of all pending claims.

By this paper, independent claims 1, 13 and 28 are amended as discussed below.

Present Amendments

Method claims 1 and 28 have been amended to specifically establish the method as "maintaining" the cryogenic condition in distinct contrast to initialization of the cryogenic condition. This amendment is in response to the Examiner's citation of certain apparatus component condition that is specifically not employed by the cited art for maintaining the desired cryogenic condition.

Method claims 1 and 28 and apparatus claim 13 have been amended by addition of a whereby clause that illuminates and emphasizes a distinct difference with respect to the prior art (that is, the pressurized flow of liquid helium – present work- contrasting with the gravity mediated flow of prior art). This is stated as a consequence of the claim elements.

Rejections per §102(b)

Claims 1-3, 5, 13 and 15 stand rejected on Muller, of record, on the basis of §102(b).

The present Action adds to the text of the previous action a citation to Muller (citing the RSI paper of Williams) regarding the concentric helium tanks of that Williams reference. Applicant points out that in the next paragraph, Muller states a disapproval of the reduced pressure of the inner tank in respect of the outer tank (col. 2, lines 13-15) and further states (col.2, lines 31-35) that the (Muller, et al) system has both tanks at atmospheric pressure. This is in contrast to the present claims: by way of example, *"reducing the pressure in the upper part of the inner chamber by pumping whilst the valve remains closed"*. Claims 1, 13, 28. Accordingly, the rejection based upon anticipation is inappropriate and requires withdrawal. Applicant also cited the Williams reference and discussed that reference in the specification.

Applicant offers amendment through the whereby clause that emphasizes this pressure difference, allowing for a simple pressurized flow of liquid helium between the inner and outer tanks.

Included in the Examiner's rejection per §102(b) at p.3 of the action, the Examiner identifies Applicant's method step of closing the valve (to stop the supply of liquid helium to the inner chamber) with Muller's mention of a valve having closure capability, but which Muller does not close during steady state operation. Muller, et al has a valve that is, possibly, initially closed at some initialization/cooling procedure. Thereafter the valve is not closed and liquid helium flows continuously at a controllable rate.

The Examiner has correctly repeated applicant's assertion that Muller teaches continuous flow of warm liquid helium to the cold reservoir. His basis for rejection of the present *method* claim per §102 is that the Muller hardware contains a flow regulating valve that is capable of a completely closed condition. The *method* disclosed by the Muller reference for maintaining the desired sub-lambda point cryogenic state, prescribes *continuous* flow of warm liquid helium through that same valve, preserving a non-equilibrium state throughout the period of operation. Upon appeal, the Examiner will be challenged to point to disclosure in this reference that prescribes closure of the valve to interrupt warm helium flow during operational use.

The casual citation of presence of a hardware element of prior art apparatus to support rejection, per §102, of a method claim is specifically challenged. The prior art is express in its teaching that the valve in question is *not* closed during that normal and usual operation in the non-equilibrium state as taught by Muller and that is precisely in contrast with the equilibrium state operational method of the present work where flow is stopped for prolonged operation, e.g., p. 12, lines 11-13:

"Then, for about the next 6 months, the needle valve 9 is fully closed off with no flow through the valve occurring, and the helium in the reservoir 16 very slowly evaporates."

Applicant respectfully requests that the Examiner withdraw the specific rejection based on §102 referencing Muller, of record, and directed at method claim 1 and its dependencies.

Rejections per §103(a)

The only independent claim rejected under this basis is claim 28 which the Examiner has simply referred to as obvious from the product structure of claims 13, 19 and 20.

Claim 28 is a method claim, the present amendment for which emphasizes the steady state operational steps for *maintaining* the desired cryogenic state. Apparatus claim 13 was rejected per §102(b) on the Examiner's observation that the reference included a valve which had a closed position, but for which such closed position was *not* employed during maintenance of the desired sub-lambda cryogenic condition. The present method claim 28 stands in contrast to the Muller reference because present claim 28 positively recites the closure of the valve in question as required to isolate the inner chamber while the inner chamber is pumped to further cool the liquid helium. Claim 28 is therefore so distinct from the method disclosed by Muller, that non-obviousness is readily apparent.

Dependent claim 22 deserves particular comment here. The Examiner correctly notes that Muller fails to disclose that his outer chamber surrounds his inner chamber. The Examiner goes on to assert that it would be obvious to anyone having ordinary skill in the art to surround the inner chamber with the outer chamber. Muller is precluded from so arranging his inner and outer chambers because Muller relies upon gravitational flow entirely where "the first chamber with the supercooled liquid helium being arranged *below* the further chamber with helium at $T = 4.2^{\circ} \text{K}$ " (emphasis added). Col. 3, lines 10-20. In the present work, flow between inner and outer chambers is enabled by the pressure difference between the chambers, not by gravity. The "cooling means ... by pumping" of claim 13 provides for a *triple* benefit: cooling of liquid helium below the lambda point *and* pressurized flow between the cold tank and the warm tank *and* the freedom to surround the cold tank with an outer tank (claim 22), thereby to obtain added thermal advantage.

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Other claims specifically rejected per section 103 depend from claims which should be found allowable.

CONCLUSION

Applicant has conscientiously moved to amend the claims so as to specifically illuminate the differences with the prior art and to reduce the issues for consideration for appellate consideration. Applicant respectfully requests entry of the present amendments and re-consideration of the same. Allowance of the pending claims is respectfully solicited.

Respectfully submitted,

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